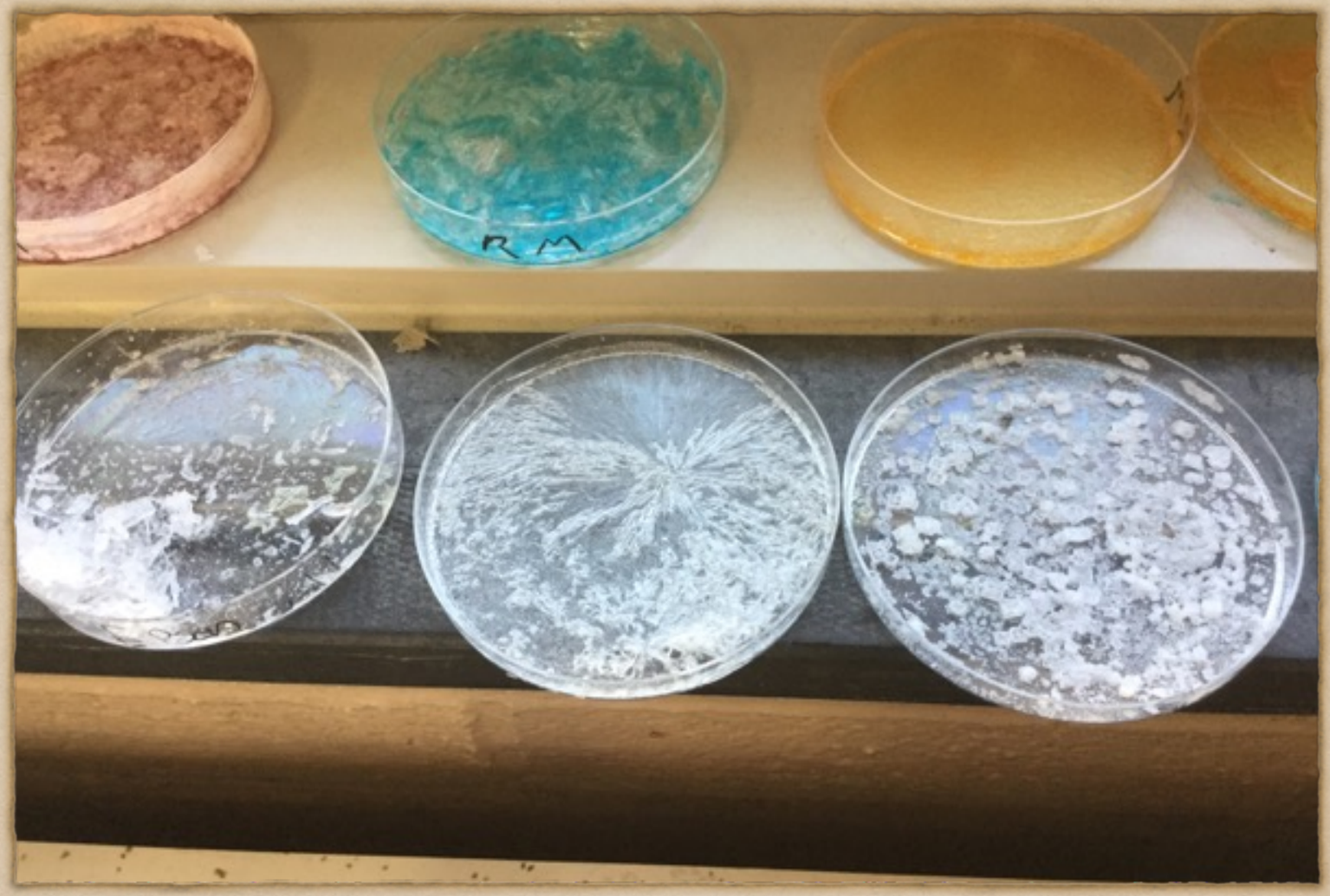


Experimental Design

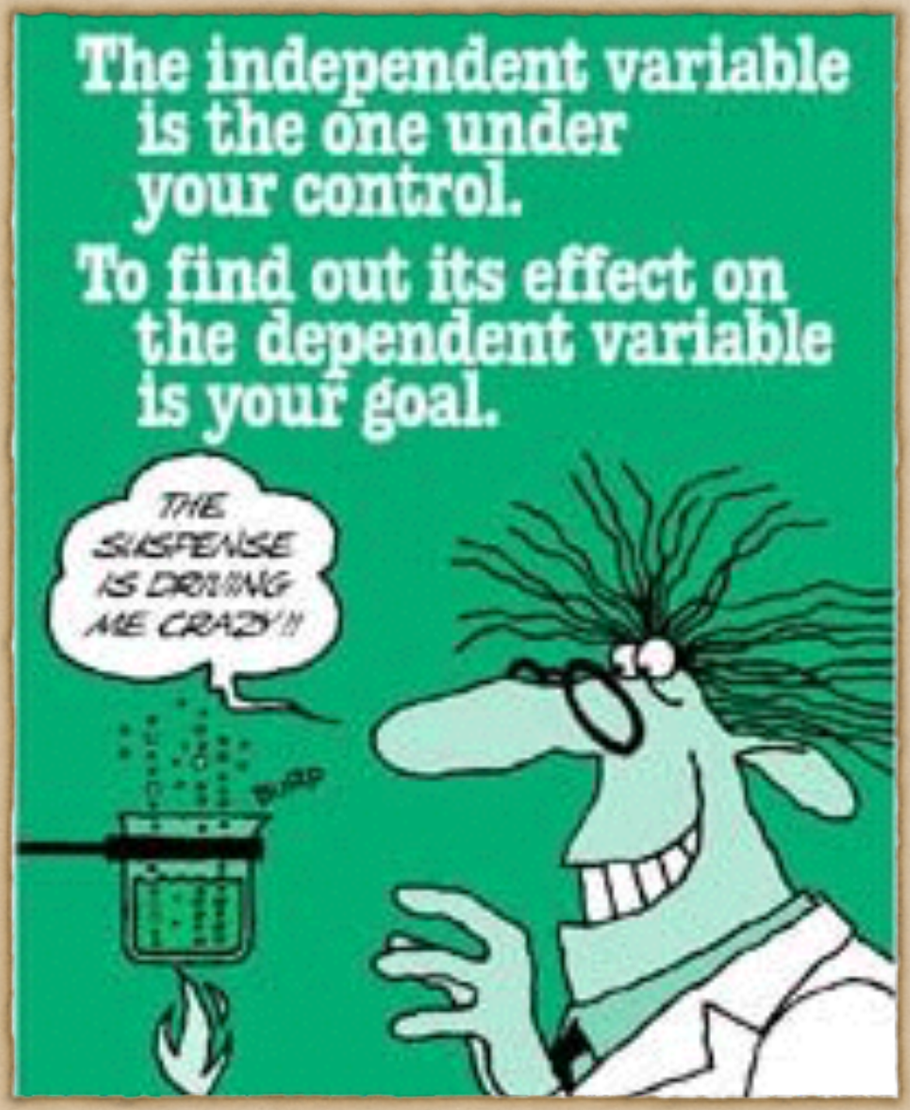
Introduction to conducting experiments

What is an Experiment?

An experiment is a test under controlled conditions that is made to demonstrate a known truth, to examine the validity of a hypothesis, or to determine the efficacy of something previously untried.

Every experiment has specific parts which can all be checked off during the design phase of an experiment. If all the parts of the experiment have been accounted for and considered carefully before the experiment is started it is more likely to be a successful and beneficial experience.

Variables



An experiment starts and finishes with the factors that change during the experiment. These are the variables. The experimenter will purposely change one of the variables; this is the independent variable or manipulated variable.

The second variable changes in response to the purposeful change; this is the dependent variable or responding variable.

Example of Variables

For example, if students change the wing shape of a paper airplane and measure the resulting time that the plane stays in flight, the independent variable would be the wing shape and the dependent variable would be the flight time.

Constants & Controls

The factors that could be changed but which are deliberately held constant are referred to as constants in the experiment.

If a constant is used to compare data with the variables, then is called the control for the experiment.

Repeated Trials

Another part of the experiment related to the independent variable is a number of repeated trials for each level of the independent variable.

If the experiment is repeated more than once for each level of the independent variable, this will make for a more reliable test.

Design Diagram

No liquid (control)	25 mL	50 mL	75 mL	100mL
1 Repeated Trials	1 Repeated Trials	1 Repeated Trials	1 Repeated Trials	1 Repeated Trials

Hypothesis

If I do this, then I predict this will happen.

Independent Variable

Dependent Variable

Before carrying out the experiment, one should formulate a hypothesis. This will be a predicted outcome for the experiment, and it will be based on past experiences as well as information gathered while carrying out background research for the experiment.

The hypothesis should be written in the form of an “if-then” statement linking a change in the independent variable to a predicted change in the dependent variable.

Keywords (English - Spanish)

Experiment - Experimentar

Variable - Variable

Constant - Constante

Control - Controlar

Independent Variable - Variable Independiente

Dependent Variable - Variable Dependiente